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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/933,912
Filing Date: August 20, 2001
Appellant(s): CHEN ET AL.

Roberta Young
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 5/24/2007 appealing from the Office action mailed 7/11/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is incorrect.

Although the Advisory Action mailed on 12/28/2006 did not state that the Amendment After Final dated 12/8/2007 would be entered for the purpose of appeal, such is the case here, the Amendment After Final dated 12/8/2007 has been entered.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6012159	Fischer et al.	1-2000
5,537,410	Li	7-1996

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

A. Claims 1-2, 4-7, 9, 33-34, 36-39, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer (USPN 6,012,159).

Regarding claim 1, as shown in Fig. 3B, Fischer teaches a method comprising:

Determining a number of frames (k = the number of original packets) that must be received and decoded correctly by an inner decoder (decoder that performs EDAC decoding in step S6) for an outer decoder (decoder that performs decoding in step S9B) to correctly decode the received frames (the subscriber determines that the number of Y' packets correctly received and decoded by EDAC decoding is equal to the number original packets, then the packets received are forwarded to a second decoder in order to recover the original file X, col. 7, lines 27-36, 49-52, and col. 8, lines 7-18, see also col. 9, lines 64-col. 10, lines 1, 13-35).

Fischer does not explicitly teach terminating reception of the frames when said determined number of frames was received correctly.

However, since Fischer teaches that if the number of correctly received packets is equal to the number of original packets, the original file can be reconstructed from the correctly received packets (col. 10, lines 13-20) and if the first k packets are received correctly, then the last k-n packets can be ignored (col. 9, lines 53-56), it would have been obvious to one skilled in the art at the time the invention was made to modify the teaching of Fischer to include terminating reception of the frames when said determined number of frames was received correctly as recited in the claim. The suggestion/motivation to do so would have been to disregard other packets since sufficient number of packets is already received for the reconstruction of the original file.

Regarding claims 2 and 34, Fischer further teaches that the n transmitted packets are encoded at the bit level using standard EDAC encoding schemes which provide redundant data

bits to the data and k is the number of original packets (col. 3, lines 1-11, col. 6, lines 24-26), therefore, it is inherent that determining an amount of redundancy (n-k) must be included. Fischer further teaches determining the number of frames that must be received correctly in accordance with the determined amount of redundancy (col. 6, lines 24-36 and col. 7, lines 49-52).

Regarding claims 4, 7, 36, and 39, Fischer further teaches that the n transmitted packets are encoded at the bit level using standard EDAC encoding schemes which provide redundant data bits to the data and k is the number of original packets (col. 3, lines 1-11, col. 6, lines 24-26), therefore, it is inherent that determining an encoding rate of received frames in accordance with the received frames and determining the amount of redundancy in accordance with the encoding rate must be included in order for the receiving end to properly decode the packets (col. 7, lines 31-36).

Regarding claims 5 and 37, Fischer teaches that if k number of packets are received correctly (col. 6, lines 29-36), therefore, determining a minimum number (one) of frames that must be received correctly must be included.

Regarding claims 6 and 38, it is inherent that increasing the determined minimum number of frames that must be received correctly by a first number (one) must be included (since the receiving side has to receive k packets correctly and k is an integer greater than one, and one

packet is being received at a time, col. 6, lines 29-36 and col. 7, lines 31-36, therefore, the minimum number of correctly received packets must be increased by one at a time).

Regarding claims 9 and 41, Fischer does not explicitly teach terminating reception of the frames when said determined number of frames was received correctly and a time during which the subscriber station is obligated to receive the frames expired.

However, since Fischer teaches that if the number of correctly received packets is equal to the number of original packets, the original file can be reconstructed from the correctly received packets (col. 10, lines 13-20) and if the first k packets are received correctly, then the last k-n packets can be ignored (col. 9, lines 53-56), it would have been obvious to one skilled in the art at the time the invention was made to modify the teaching of Fischer to include terminating reception of the frames when said determined number of frames was received correctly and a time during which the subscriber station is obligated to receive the frames expired as recited in the claim. The suggestion/motivation to do so would have been to The suggestion/motivation to do so would have been to disregard other packets since sufficient number of packets is already received for the reconstruction of the original file.

Claim 33 is an apparatus claim corresponding to method claim 1, therefore is rejected under the same reason set forth in the rejection of claim 1. In addition, the apparatus (the receiving end) must include a processor and a storage medium comprising a set of instructions executable by the processor in order for the apparatus to process the receiving packets (col. 9, lines 53-56).

D. Claims 3, 8, 35, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer (USPN 6,012,159) in view of Li (USPN 5,537,410).

Regarding claim 3, 8, 35 and 40, although Fischer further teaches that the n transmitted packets are encoded at the bit level using standard EDAC encoding schemes which provide redundant data bits to the data (col. 3, lines 1-11, col. 7, lines 18-30), Fisher fails to teach providing the amount of redundancy and an encoding rate of received frames independently of the received frames.

However, Li teaches informing the receiving end of the data rate (thereby includes the encoding rate and the amount of redundancy) a frame to be received independently of the frame to be received (as shown in Fig. 4 and in the Abstract, lines 1-6, the data rate of the next frame is indicated in the current frame, therefore, the redundancy and encoding rate of the next frame is provided independently of the next frame).

Given the teaching of Li, it would have been obvious to one skilled in the art at the time the invention was made to modify the teaching of Fischer to include the teaching of Li such that providing the amount of redundancy and an encoding rate of received frames independently of the received frames would be included. The suggestion/motivation to do so would have been to reduce the processing load of the receiving end as suggested by Li (see lines 1-6 of the Abstract).

(10) Response to Argument

A. The objections to claims 10, 20, and 52 are withdrawn in view of applicant's

arguments.

B. The rejection under 35 U.S.C. 112, second paragraph of claims 14-15 is also withdrawn in view of applicant's amendment.

C. Appellant's arguments and Examiner's responses regarding claims 1-2, 4-7, 9, 33-34 36-39, and 41 are as follows:

i) Appellant's argument: On pages 13-14, Fischer does not teach the limitation (i) "determining a number of frames that must be received and decoded correctly by an inner decoder for an outer decoder to correctly decode the received frames" and the limitation (ii) "terminating reception of the frames when said determined number of frames was received correctly". Fischer only teaches transmitting extra frames, receiving as many frames as is possible to receive and then comparing the quantity of received frames to determine if "the number of Y' packets correctly received are greater than or equal to the number of original packets." In other words, Fischer teaches comparing the quantity of received packets *only after* all of the packets that can be received have in face been received. Therefore, Fischer teaches away from the limitation "terminating reception of the frames."

ii) Examiner's response: Fischer teaches:

> In step S4, the codefile Y is transmitted to the subscriber computer using packet-based broadcast protocols. Codefile Y has n-k additional packets than the original file X and thus requires more bandwidth than the original file. (Fischer, col. 7, lines 27-30).
>
> In step S5, any one of the subscriber computers receives a sequence of packets Y'_i, i= 1, 2, ..., n, which are the packets of codefile Y corrupted by the noise channel. In step S6, EDAC decoding is performed by the satellite receiver

device or the subscriber computer to detect and correct, if possible, bit-level errors within the Y' packets. (Fischer, col. 7, lines 27-36).

If the number of Y' packets correctly received are greater than or equal to the number of original packets, then the original file X can be recovered in steps S8a, S8b, S9a and S9b. (Fischer, col. 7, lines 49-52; emphasis added).

In step 9a, the first k symbols y'_i1, from the correctly received packets Y'I used to form A, are used to form a vector z1 of length k. In the example....X_i1 is the recovered first symbol from the original packet X_i, for all I = 1, 2, ... k. Steps S9a and S9b are looped through until all j symbols forming the original packets X have been recovered. (Fischer, col. 8, lines 7-18).

Consider, for example, a digital file consisting of ***k=7 original packets***...This file is encoded ..., yielding ***a sequence of n=10 encoded packets***..The encoded packets are transmitted in sequence over a satellite transmission channel to a large number of subscriber computers. ***Subscriber computer C correctly receives encoded packets 1, 3, 5, 6, 7, 9, and 10, but misses encoded packets 2, 4, and 8. As the number of correctly received packets is equal to the number of original packets, the original file can be reconstructed from the correctly received packets***... (Fischer, col. 9, lines 64-col. 10, lines 1, 13-55; emphasis added).

On the receiving side, ***in the case where the first k packets are received correctly, there is no need for decoding since the first k received packets are exactly the same as the k original packets and the last k-n packets can be ignored***. (Fischer, col. 9, lines 53-56).

Regarding the limitation (i), it is clear from the recitation above that Fischer teaches the limitation (i) as follows:

Determining a number of frames (k = the number of original packets) that must be <u>received and decoded correctly</u> by an inner decoder (a decoder that performs EDAC decoding in step S6) for an outer decoder (a decoder that performs decoding in step S9B) to correctly decode the received frames, col. 7, lines 27-36, 49-52, col. 8, lines 7-18, see also col. 9, lines 64-col. 10, lines 1, 13-55. In other words, it is determined that when "k" number of Y' frames are correctly received and decoded by an EDAC decoder in step S6, then a decoder in step S9B can correctly decoded the received frames.

Regarding the limitation (ii), Fischer does not explicitly teach the step of terminating reception of the frames when said determined number of frames was received correctly.

However, since Fischer mentions that if the number of correctly received packets is equal to the number of original packets, the original file can be reconstructed from the correctly received packets (col. 10, lines 13-30) and that when the first k packets are received correctly, the last k-n packets can be ignored (col. 9, lines 53-56), it would have then been obvious to one skilled in the art at the time the invention was made to modify the teaching of Fischer to include the step of terminating reception of the frames when said determined number of frames was received correctly as claimed in order to disregard other packets as sufficient number of combination of packets are already received for the reconstruction of the original file.

Examiner respectfully disagrees with the Appellant's alleges that Fischer only teaches transmitting extra "frames", receiving as many frames as is possible to receive and <u>then</u> comparing the quantity of received frames to determine if "the number of Y' packets correctly received are greater than or equal to the number of original packet". No where in Fischer teaches that the determination of whether k of Y' packets have been correctly received must be performed <u>only after</u> the reception of as many of Y' packets as pointed out by the Appellant. Not only that it just would not make any sense, it would make the system of Fischer very inefficient for having to wait until as many packets can be received are received first, then decode the packets to see if k packets have been received correctly. In contrast, it is clear from

Fig. 3B of Fischer that received packets must be decoded at the bit level as new packets arrive at the receiver; otherwise, step S7 of marking lost packets as lost will not happen as the bit level decoder in step S6 would never start decoding since the receiving portion would keep waiting for the lost packets (i.e., the receiving portion would not even be aware that some packets were lost, what packet sequence numbers had already been received, or whether it had received all the packets that could be received). In fact, Fischer even points out how efficiency can be improved -- that if the first k packets are correctly received, there is no need for decoding since the first k received packets are exactly in the same as the k original packets and the last k-n packets can be ignored (col. 9, lines 53-56). Thus, Fischer does not teach away from the limitation (ii).

Therefore, it would have been obvious to and within routine skills of one skilled in the art to modify the teaching of Fischer to include terminating the reception of the frames when any combination upto k frames are correctly received since only the combination of k frames are needed for the reconstruction of the original file and the remaining of the packets are not. Such modification would have made the system of Fischer more efficient as the remaining of the packets can be ignored (i.e., not received and decoded); thereby saving resources of both the receiving portion and the decoding device.

In addition, the Appellant fails to point out an error in the motivation. The rejection is maintained.

D. Appellant's arguments and Examiner's responses regarding claims 3, 8, 35, and 40 are as follows:

i) Appellant's argument: Li does not teach providing the amount of redundancy independently of the received frames, and a data rate is independent of the encoding rate and the amount of redundancy.

ii) Examiner's response: Firstly, it is true that a data rate may be independent of the encoding rate and the amount of redundancy if the data is transmitted without encoding. However, when the original data is encoded with the redundant bits at certain encoding rate as shown in Fig. 3 of Li, the total amount of bits transmitted constituting the data rate must include the redundant bits. Thus, when data is encoded, the data rate depends on the encoding rate and the amount of redundancy applied.

Secondly, Li teaches informing the receiving end of the data rate of the next frame which is independent of the current frame being received (col. 6, lines 36-42). The data rate is the data rate of the encoded data (equivalent to the encoding rate since encoding rate can be derived from the data rate) contained in the next frame, which can be 8600 bps, 4000 bps, 1900 bps, or 700 bps for full, half, quarter, and eight rates, respectively (col. 6, lines 27-col. 7, lines 10), and the symbols in a frame are repeated for half, quarter, or eight rates (equivalent to the amount of redundancy) before being transmitted to the receiving end (col. 6, lines 27-36). The receiving end would then process the next frame including reversing functions of the repeat symbols block 64 in Fig. 3 using the data rate information included in the current frame (col. 8, lines 52-col. 9, lines 1-12). Therefore, the claim limitation of providing the amount of redundancy and an

encoding rate of received frames independently of the received frames is met. The applicant also fails to point out an error in the motivation. Therefore, the rejection is maintained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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